DEVELOPMENT OF ASSESSMENT INSTRUMENT IN ACID-BASE PRACTICUM BASED ON CONTEXTUAL LEARNING

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Abstract: This experiment aims to produce assessment instrument in acid-base practicum in contextual learning on class XI. Form of research is Research and Development. The development model is procedural development. Data collected by using a feasibility questionnaire and teachers' product responses questionnaire. Results of feasibility analysis of questionnaire data obtained by the average percentage feasibility assessment instrument of 92.49% with criteria very high. Results of the data analysis of teachers' questionnaire responses obtained an average percentage of 91.25% teachers' response to the very high response criteria. Assessment instruments developed can be used as an assessment tool to assess the psychomotor and affective aspects with an average value of 96.35 and psychomotor aspects of the average value of the affective aspects of 95.83.
Keywords: development, assessment instrument, contextual learning

Abstrak: Penelitin ini bertujuan untuk menghasilkan instrumen penilaian dalam praktikum asam basa berbasis kontekstual di kelas XI yang layak digunakan. Bentuk penelitian yang digunakan adalah penelitian pengembangan. Model pengembangan yang digunakan adalah model pengembangan prosedural. Pengumpulan data dilakukan dengan menggunakan angket kelayakan produk dan angket respon guru. Hasil analisis data angket kelayakan diperoleh persentase rata-rata kelayakan instrumen penilaian sebesar 92,49% dengan kriteria kelayakan sangat tinggi. Hasil analisis data angket respon guru diperoleh persentase rata-rata respon guru sebesar 91,25% dengan kriteria respon sangat tinggi. Instrumen penilaian yang dikembangkan dapat digunakan sebagai alat penilaian untuk menilai aspek psikomotor dan afektif dengan nilai rata-rata aspek psikomotor sebesar 96,35 dan nilai rata-rata aspek afektif sebesar 95,83.
Kata kunci: pengembangan, instrumen penilaian, pembelajaran kontekstual.

Chemical subjects is one of the principal lessons to be learned by students majoring in science students. Studying the chemical material should be done through theory and practice, practice in the laboratory and in the field. Learning theory is done to provide prior knowledge to the students to know the concept of a material that is an assessment of cognitive aspects, while learning through practice is done to prove the concept that has been studied as well as skills that can support learning and can be applied in everyday life. Students who have passed the lab work is considered to have mastered the learning aspects of cognitive, affective and psychomotor (Sudrajat, Permanansari, Zainul and Buchari, 2011).

The practicum method is a way of presenting the lesson in which students conduct experiments with the experience and prove themselves learned something (Hidayati, 2012). In other words, in the learning process by the method of the practicum, students are given the opportunity to experience for themselves or do their own, following a process, observing an object, analyze, demonstrate and draw their own conclusions about an object, condition or process anything. Assessment conducted on learning with this method should use the skills assessment can assess three areas of assessment, namely cognitive, affective and psychomotor.

Results of the interview on 2nd and 3rd February 2015 with the chemistry teacher SMAN 1 Sungai Ambawang, chemistry teacher SMAN 2 Sungai Ambawang and chemistry teacher SMAN 2 Sungai Raya was obtained information that: (1) learning with practical method is rarely done. This is due to lack of tools and materials available in schools, and less time to teach all the material. Learning with practical method is only performed on lab activities that the tool and the material is easily obtained from the surrounding environment or context-based practicum. One of these indicators of acid-base materials: natural indicators, (2) the teachers in the learning lab is not yet complete, particularly assessment of the psychomotor and affective aspects. Assessment is still focused on the assessment of cognitive aspects, (3) The rubrics function in the assessment of the lab is still not optimal. There are still many assessments that teachers do not use a rubric. Ratings that do not use this section is done by using unstructured observation that led to teacher assessment is subjective conducted on students who stand out only when the lab.

According to Widyaningsih (2013), in assessing the practical learning must thoroughly for any activity or competence to be achieved. Competence to be achieved should include cognitive, and affective psikimotor. Therefore, in the learning lab assessment should include these three aspects.

According to Permana Sari, Zainul, and Buchari (2011), in the learning of science teachers are expected to assess lab processes and learning outcomes in a comprehensive and true science. Comprehensive means assessment was conducted covering various aspects of competence. True meaning penialian conducted in accordance with the purposes and principles prinsisp Penialain objective, validity, reliability, and can be communicated. Therefore, in order that an assessment can be carried out comprehensively and correctly, it takes an assessment tool in the form of assessment rubrics that can assess the learners are practical yet comprehensive and more accurate and more complete is based on evidence (documents) that belongs to each student , According Widyaningsih (2013), the rubric is used to assess student performance. Rubric assessment is required to document the development of students' progress, so teachers do the assessment is objective. Therefore, in assessing the lab, it takes a scoring rubric.

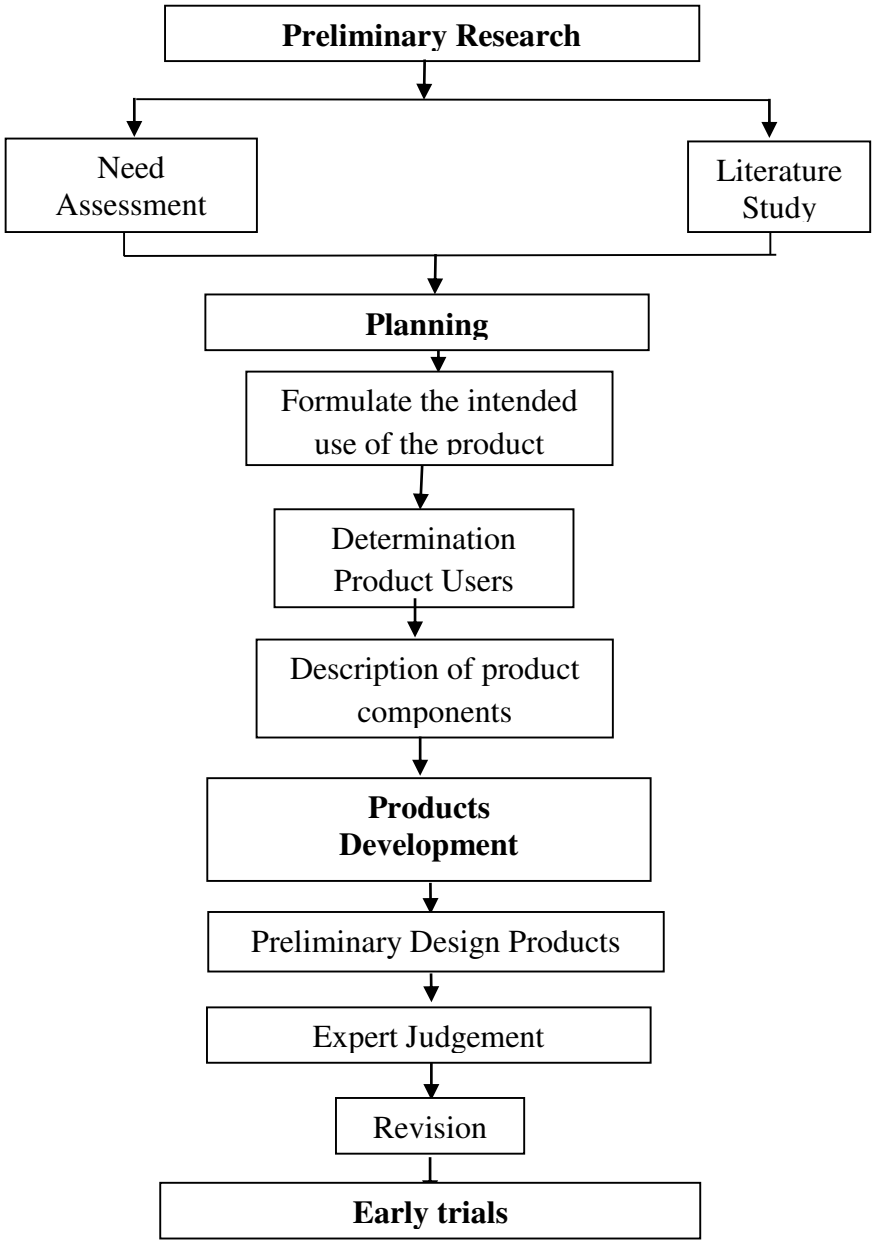
Based on some of the problems outlined above, it is important to research the development of assessment instruments in the lab acid base contextually based on class XI SMA Kubu Raya. Through this research are expected to developed assessment instrument that can assist teachers in conducting assessments can assess the entire competence of learners objectively. This research is also

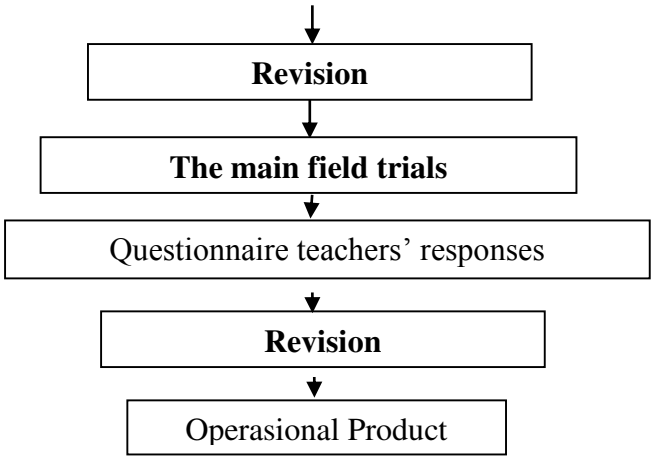
expected to be input and insight for high school teachers in Kubu Raya regarding assessment varied.

METHODS

Forms of research used in this study is the research and development (R & D) by Borg and Gall (1983). The development model used in this study is a model of procedural development. Research subjects in this study is the assessment instrument to assess the psychomotor and affective aspects of students in lab-based contextual acid base. Penelititan object of this is high school students of class XI IPA at SMAN 2 Sungai Ambawang, SMAN 1 Sungai Ambawang, and SMAN 2 Sungai Raya.

Procedure development research assessment instruments, as follows:





Picture 1. Chart Research Procedure

The research data collection tool is a questionnaire assessing the feasibility of assessment instruments in Practical Acid Alkali contextual-based and teacher responses to the Questionnaire in the assessment instruments Practicum Bases Acid-based contextual. Questionnaire appraisal assessment instruments in contextual-based Practicum Bases Acid serves to assess product feasibility level assessment instrument based on expert opinion (expert judgment). This questionnaire was given to the experts to find out the expert opinion or input on a product that was developed before tested in the study. The questionnaire results subsequently used as material validation and revision of products developed so that the product is eligible to be tested in the study. The feasibility validation component includes feasibility contents rubric, linguistic appropriateness, feasibility and presentation of constructs. Assessment questionnaire in this study using a 4 Likert scale is very unfit (1), does not deserve (2), worth (3), and a very decent (4). Questionnaire responses to teacher assessment instruments in Practical Acid Alkali contextual-based questionnaire was used to study the response of teachers to the holistic rubric that has been done in contextual learning in acid-base chemistry lab. This questionnaire given to teachers well after the initial field trials and after the main field trials. Questionnaire responses in this study compiled by 4 Likert scale strongly agree (4), agree (3), disagree (2), and strongly disagree (1). Before being given to the teacher, the questionnaire is first validated questionnaire that is fit for use as a research instrument. In this study, validation is validated by two lecturers chemical education.

The data analysis of this study consisted of the analysis of feasibility and analysis of teacher response test. Techniques of analysis is as follows:

1. **Expert Judgment**

   The procedures assessment questionnaire data analysis assessment instruments:

   1) Calculate the total score for each item / statement.
   2) Determine the acquisition of a total score per statement with the following criteria:
   3) Calculate the percentage of scores per item acquisition by the formula:

$$P = \frac{\sum X}{\sum Xi} \times 100\ \%$$

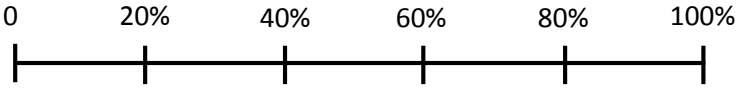
By: P = percentage scores acquisition
Σ X = the amount of gain scores (total score) for each item
Σ Xi = number of ideal score (highest score)
(Riduwan, 2008)

4) Calculate the average percentage of the overall feasibility of the assessment tool by the formula:

$$V = \frac{\sum P}{n}$$

By: V = the average percentage validity
ΣP = average number of percentage score for each aspect
n = number of aspects assessed
(Riduwan, 2008)

5) Determine eligibility criteria for the interpretation of assessment instruments with the following criteria:



Description: Figures 0-20% Catagory : Very Low
The figure of 20% - 40% Catagory : Low
Figure of 40% - 60% Catagory : Enough
Figures of 60% - 80% Catagory : High
Figures of 80% - 100% Catagory : Very High
(Riduwan, 2008)

2. Teachers Responses

The procedures analysis of the data questionnaire responses were as follows:

1) Calculate the frequency of respondents who chose SS, S, TS and STS on each item.
2) Calculate the total score of each item with the following criteria:

Table 1. Response to the Likert Scale Score Analytical Assessment Rubric

Catagory	Positive Statements	Negative Statements
SS	4	1
S	3	2
TS	2	3
STS	1	4

Source: Riduwan, 2008

3) Calculate the percentage of the total score per item acquisition by the formula:

$$P = \frac{\Sigma X}{\Sigma Xi} \text{ x } 100\%$$

By: P = percentage scores acquisition
Σ X = the amount of gain scores (total score) for each item
Σ Xi = number of ideal score (highest score)

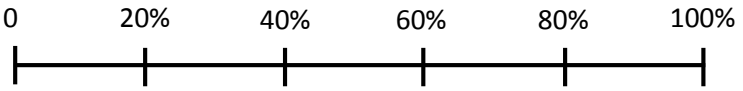
(Riduwan, 2008)

4) Calculate the percentage of total responses to the formula:

$$P_{total} = \frac{\Sigma P}{n}$$

By: Ptotal = percentage of total responses
ΣP = number of percentage scores acquisition
n = number of items / statements

5) Determine eligibility criteria for the interpretation of assessment instruments with the following criteria:



Description:	Figures 0-20%	Catagory : Very Low
	The figure of 20% - 40%	Catagory : Low
	Figure of 40% - 60%	Catagory : Enough
	Figures of 60% - 80%	Catagory : High
	Figures of 80% - 100%	Catagory : Very High

(Riduwan, 2008)

RESULT AND DISCUSSION

1. Need Assessment

Need Assessment aimed to look at the feasibility assessment instrument developed by researchers. Developed assessment instrument consisting of:

a. Rubric Assessmenr of manufacturing process
b. Rubric assessment of products (natural indicator paper)
c. Rubric assessment of report
d. Rubric assessment of Attitude
e. Self-assessment rubric of manufacturing process
f. Self-assessment rubric of products (natural indicator paper)
g. self-assessment rubric of report
h. Self-assessment rubric of attitude

Evaluation components include a feasibility test the feasibility of the content, language, practicality, and construction. Based on the assessment of experts for feasibility studies, the data showed the feasibility of assessment instruments that are presented in Table 2.

Table 2. Average results of the Expert Assessment Test Feasibility Assessment Instrument Developed

No	Rated aspect	Rating result	
		Average Score Total (%)	Criteria
1	Feasibility Contents	95	Very High
2	linguistics	87,18	High
3	Practicality	94,37	Very High
4	Construction	94,37	Very High
	Average Overall	92,73	Very High

Retrieved from Table 2. The average percentage of the entire feasibility assessment rubric of 92,734% with the eligibility criteria is very high, so it can be concluded that the assessment rubric developed very feasible to be used as an assessment tool.

Assessment instruments developed feasibility has an average content of 95% with a very high category. This is because the assessment instruments developed by the needs assessment has been done in terms of the demands of the curriculum SBC, which examines Competency Standards (SK) and the Basic Competency (KD), so that the assessment instruments developed assess the competence to be achieved in accordance with the education syllabus. In addition, the assessment instrument that assesses skills developed in accordance with the skills that will be assessed on each activity.

Assessment instruments developed had an average of linguistic appropriateness of 87,19% with a very high category. This is because the assessment instruments developed has been done several times revised by experts so sesaui with Indonesian rules which include: punctuation, spelling and sentence. Moreover, the language used in the assessment instruments developed not contain unfamiliar terms that are difficult to understand, so the assessment instruments developed easily understood.

Assessment instruments developed have an average practicality of 94,37% with a very high category. This is because the assessment instruments developed have clear guidelines to help make the assessment that teacher assessment is clear, correct and comprehensive, so as to help the teacher to make an assessment. In addition, the assessment instruments developed assess contextual-based lab activities that cause praktikumnya can be done by any teacher, so that the assessment instruments developed flexible when used by other teachers.

Assessment instruments developed construct has an average of 94,37% with a very high category. This is because the assessment instruments containing skills developed, descriptions of skills, and the scale of assessment is a component of the preparation of the assessment rubric, so that the assessment instruments developed have suggested constructs format.

2. Teachers' Response

The teachers' response assessment conducted in early trials and Main field trials. In early trials, the teachers' response only did on chemistry teacher SMAN 2 Sungai Ambawang, while for the main field trial, the response of teachers conducted in a chemistry teacher SMAN 2 Sungai Ambawang, chemistry teacher SMAN 1 Sungai Ambawang, chemistry teacher SMAN 2 Sungai Raya. Assessment is based on the teacher's response questionnaire responses of teachers with the following statement:

a. Assessment rubric developed easy to use as an instrument of assessment
b. The formulation of the assessment rubric statement does not cause a double interpretation or misunderstanding
c. The language used in the assessment rubric easy to understand
d. The criteria are assessed in accordance with the rubric of competence to be achieved
e. Assessment rubrics developed to help the assessment process
f. Assessment rubric developed difficult to use as instruments of assessment
g. The formulation of the assessment rubric statement raises a double interpretation or misunderstanding
h. The language used in the assessment rubric convoluted
i. The criteria considered in the rubric are not in accordance with the competence to be achieved
j. Assessment rubric developed does not help the assessment process

Based on the results of the assessment of teachers responses on field trials beginning, obtained an average percentage of 100% with a very high category. The teacher gives a very high response to the assessment instruments developed for the assessment instruments developed revised by experts, so that the assessment instruments developed fit for use as an assessment instrument.

Based on the results of the assessment the teacher's response on the main field trials, it obtained an average response of the teachers presented in Table 3.

Table 3. Average Responses of Teachers' Response

No	Assessment Instruments	Average Teachers' Response (%)
1	Rubric Assessmenr of manufacturing process	91,67
2	Rubric assessment of products (natural indicator paper)	91,67
3	Rubric assessment of report	91,67
4	Rubric assessment of Attitude	90,00
5	Self-assessment rubric of manufacturing process	91,67
6	Self-assessment rubric of products (natural indicator paper)	91,67
7	Self-assessment rubric of report	91,67

8	Self-assessment rubric of attitude	90,00
	Total	73,02
	Overall Average Teachers' Response	91,25

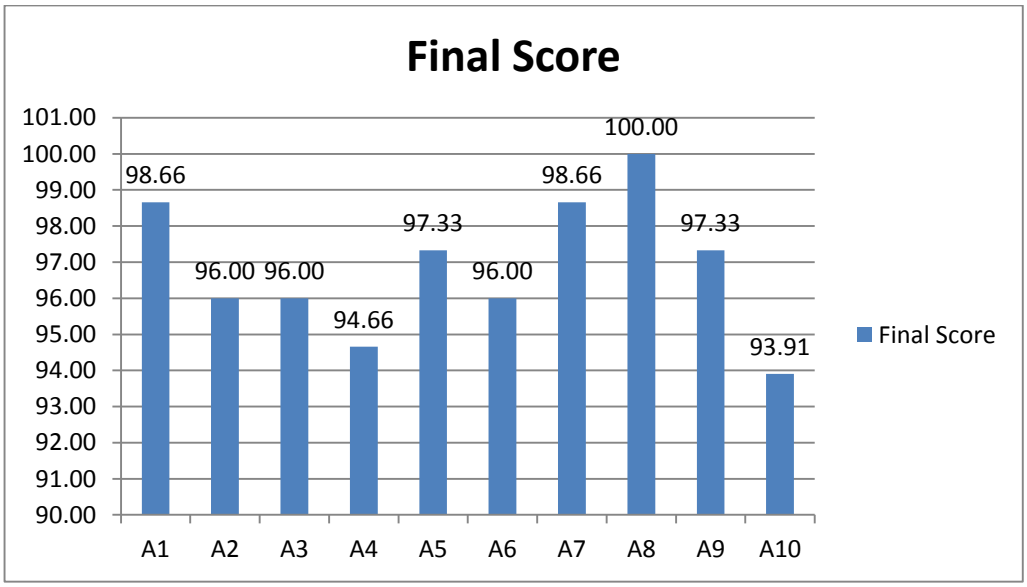
Retrieved from Table 3. The average response is a teacher at 91, 25% with a very high criteria. This is because the assessment instruments developed for the assessment instruments developed revised by experts, so that the assessment instruments developed fit for use as an assessment instrument.

3. Psychomotor and Affective Students' Score

After conducting initial field trials and major field trials using assessment instruments developed, acquired value aspects of psychomotor and affective aspects of students' grades. Pskomotor aspect value is obtained from the total score assessment process of making a product, a natural indicator paper product assessment, assessment reports, as well as self assessment of each of these assessments, whereas the value of the affective aspect remedy derived from the total score, the assessment and self-assessment attitude.

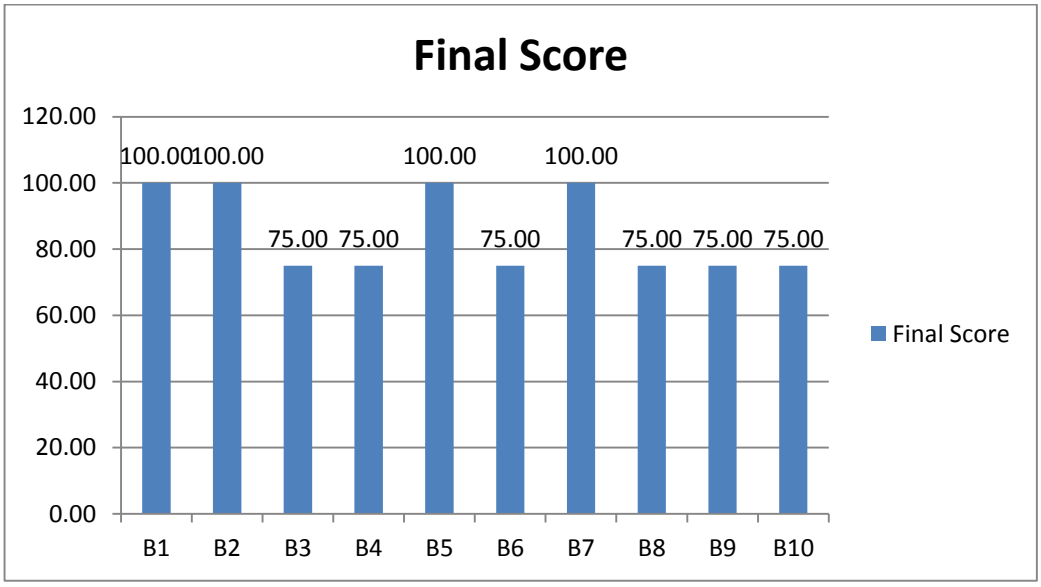
a. Early Field Trial

Based on the results of the initial field trials, the value of psychomotor aspects SMAN 2 Sungai Ambawang are presented in Picture 2:



Picture 2. The Score of Psychomotor Aspect of Students SMAN 2 Sungai Ambawang

Whereas for the value of the affective aspect of students of SMAN 2 Sungai Ambawang in early field trials are presented in Picture 3 .:



Picture 3. The Score of Affective Aspect of Students SMAN 2 Sungai Ambawang

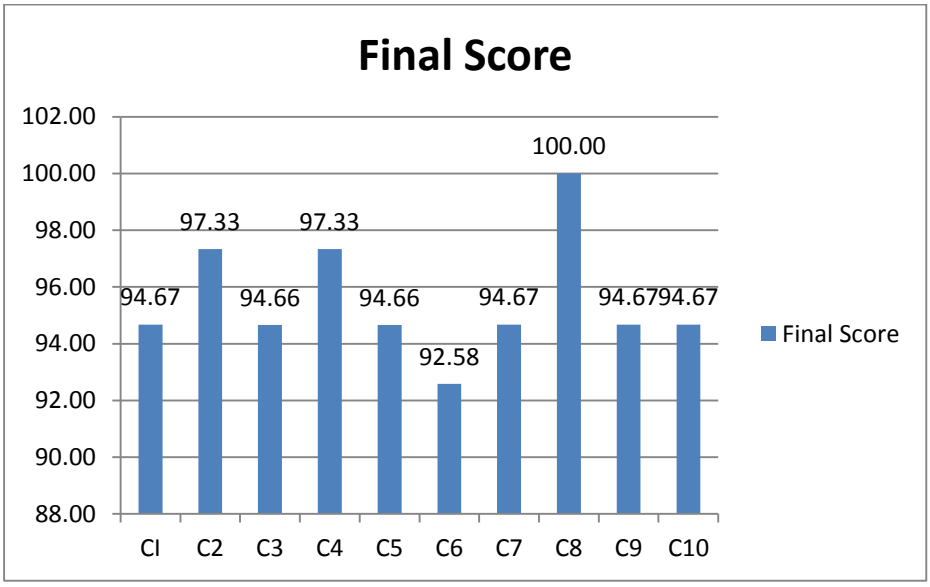
Based on the results of the assessment psychomotor and affective aspects of students in the early field trials, the average value of students psychomotor aspects of 96,85 and the average value of the affective aspects of students at 85. Based on the psychomotor and affective student in mind that the level of students in the psychomotor domain at the level of Guided Response (Response Guided), due to the activities of assessment of students of students learning a complex skill such as imitating and movements try, while the level of the students in the affective domain in town at levels Valuing (Award), because the students apply the price or value of the an object, phenomenon, or behavior, which the assessment is based on the internalization of a particular set of values expressed in behavior. Therefore, it can be said that developed assessment instruments can assess psychomotor and affective aspects of students.

b. Main Field Trial

The main field trial was conducted at three schools, namely, SMAN 2 Ambawang River, SMAN 1 and SMAN 2 Ambawang Sungai Sungai Raya.

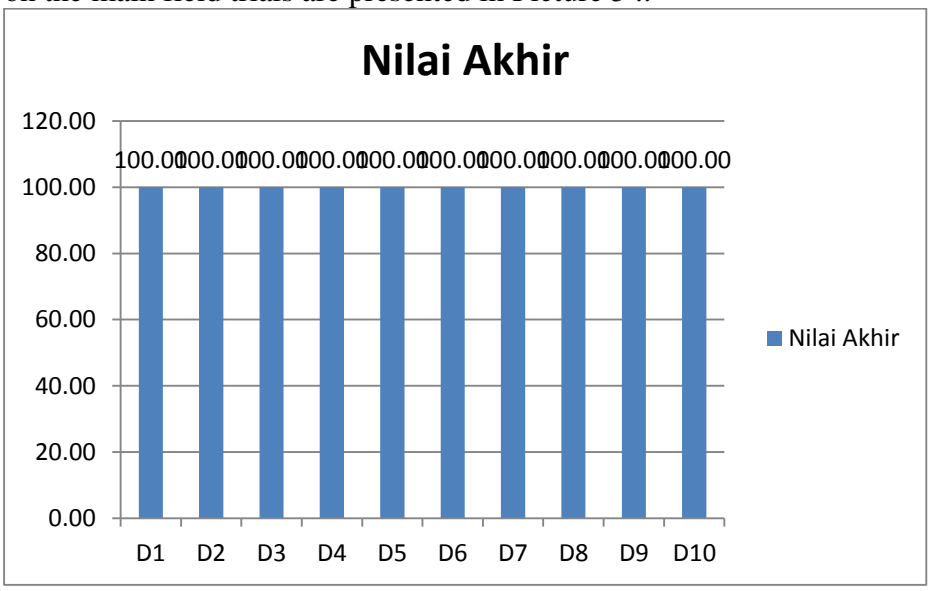
a) SMAN 2 Sungai Ambawang

Based on the results of the primary field trials, the value of psychomotor aspect SMAN 2 Sungai Ambawang are presented in Picture 4.:



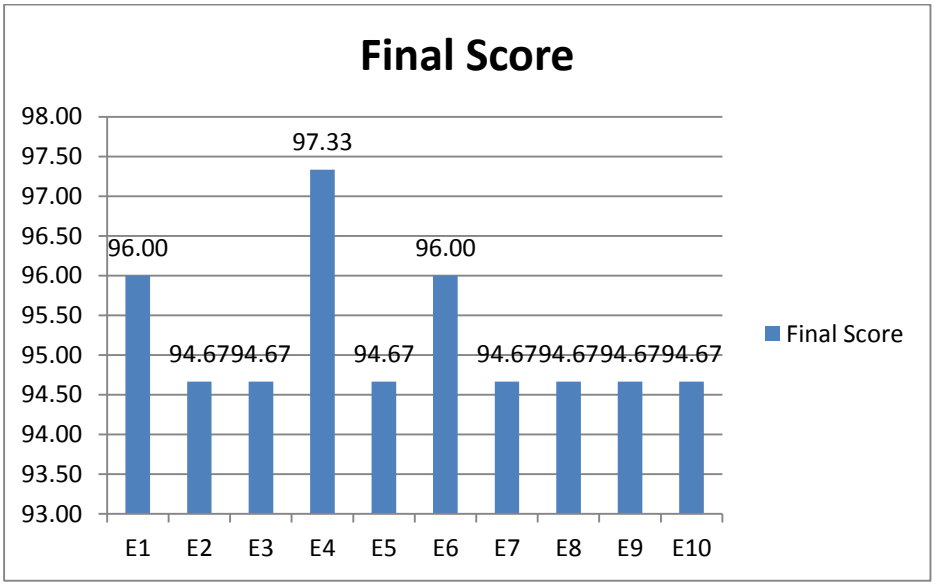
Picture 4. The Score of Psychomotor Aspect of Students SMAN 2 Sungai Ambawang

While for the Affective aspect SMAN 2 Sungai Ambawang on the main field trials are presented in Picture 5 .:



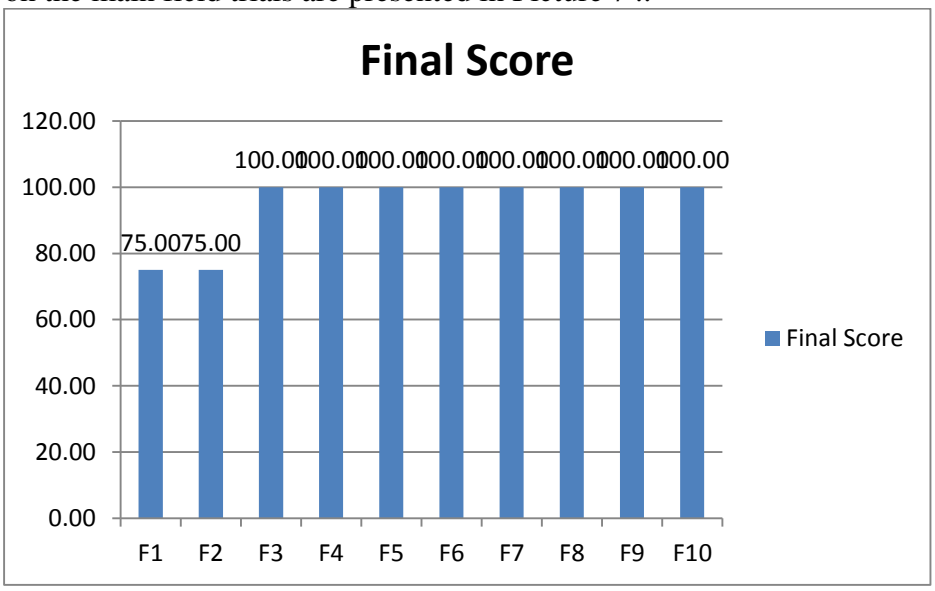
Picture 5. The Score of Affective Aspect of Students SMAN 2 Sungai Ambawang

b) SMAN 1 Sungai Ambawang
Based on the results of the primary field trials, the value of psychomotor aspect SMAN 1 Sungai Ambawang presented in Picture 6 .:



Picture 6. The Score of Psychomotor Aspect of Students SMAN 1 Sungai Ambawang

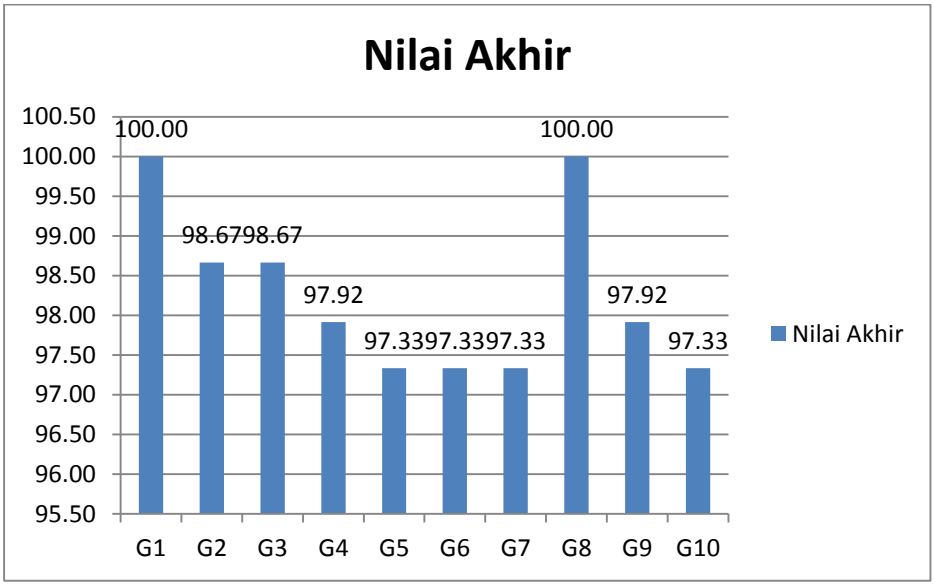
While for the affective aspect SMAN 1 Sungai Ambawang on the main field trials are presented in Picture 7 .:



Picture 7. The Score of Affective Aspect of Students SMAN 1 Sungai Ambawang

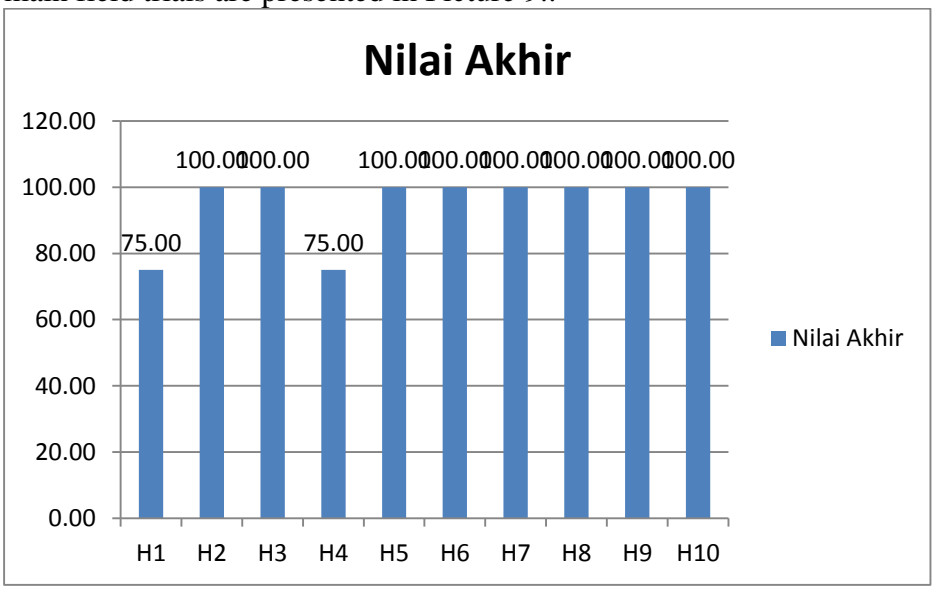
c) SMAN 2 Sungai Raya

Based on the results of the primary field trials, the value of psychomotor aspect SMAN 2 Sungai Raya presented in Picture 8 .:



Picture 8. The Score of Psychomotor Aspect of Students SMAN 2 Sungai Raya

While for the affective aspect SMAN 2 Sungai Rayaon the main field trials are presented in Picture 9.:



Picture 9. The Score of Affective Aspect of Students SMAN 2 Sungai Raya

Based on the results of the assessment psychomotor and affective aspects of students on the main field trials, diporoleh average value of students psychomotor aspects of 96,35 and the average value of the affective aspects of students amounted to 95,83. Based on the psychomotor and affective student in mind that the level of the students in the psychomotor domain is at the level Guided Response (Response Guided), due to the activities of

assessment of students of students learning a complex skill such as imitating and movements try, while the level of the students in the affective domain in town on Valuing levels (Award), because the students apply the price or value of an object, phenomenon, or behavior, which the assessment is based on the internalization of a particular set of values expressed in behavior. Thus, it can be said that developed assessment instruments can assess psychomotor and affective aspects of students.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the results of research conducted, it can be concluded that: (1) assessment instruments developed extremely fit for use as a practical tool in the assessment of acid-base contextually based on class XI SMA camp with the average percentage of the overall feasibility of 92,49 with the eligibility criteria very high, (2) The response of teachers to use assessment instruments developed very well in assessing learners practicum acid base contextual based on class XI SMA camp with the average percentage of the response of teachers overall in field trials beginning at 100% with the criteria of response is very high and the average response overall teacher on the main field trials of 91,25% with a very high response criteria, and (3) assessment instruments developed can be used as an assessment tool to assess the psychomotor and affective aspects with an average value of psychomotor aspects of 96,85 and the average value of the affective aspects of 85 on field trials early. Meanwhile, the average value of psychomotor aspects of 96,35 and the average value of the affective aspects of 95,83 in the main field trials.

Recommendations

Based on the results of research conducted, there are some suggestions that suggested the researchers, namely: (1) Should the assessment, teachers use assessment instruments such assessment rubrics and assessments that teachers are objective and in accordance with the learning process is carried out, (2) Should schools providing socialization and training for teachers to make assessment instruments in the form of an assessment rubric in the learning process, (3) Should further research on the effective use of assessment instruments developed in learning.

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